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Nutrient Recycling with Sugar Cane Ash in Urban Agriculture – Results for lettuce and Cucumber

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Abstract

The reutilisation of sugar cane ash in agriculture is an important issue to create nutrient cycles and to save fertilisers in Cuba. Nutrient cycling is also an important issue in the urban garden system in Cuba (so called organopónicos) which based on compost substrates. However, the use of biomass ashes in such gardens is rarely investigated until now. Therefore, agronomic impacts of sugar cane ash were investigated in combination with cucumber (*Cucumis sativus*) and lettuce (*Lactuca sativa*) in two experiments with compost substrates. In the first experiment pots were filled with 1 kg substrate and amended with two levels of sugar cane ash (9.6 and 14.4 g per pot). These treatments were compared with a commercial PK fertiliser and a control without mineral nutrient addition under controlled conditions. A second experiment was established in an urban garden where a treatment with ash application of 8.5 t ha⁻¹ was compared with a control without ash application. Morphological plant characteristics, yields, and uptakes of plant nutrients as well as soil nutrients were included in the investigation program. In the pot experiment the fertiliser effect of sugar cane ash was comparable with the mineral PK fertilisation for both crops without any significant differences in shoot height, root length and yields. In the field experiments, the application of sugar cane ash resulted in a yield increase of cucumber fruits (22–34%) and lettuce leaves (25–32%). Despite the higher yields and following higher nutrient removals, increased levels of P and K were still found in the soil after plant harvest. Although the gardens based on nutrient-rich compost substrate, the results have shown that adding biomass ashes can further increase vegetable yields here. The ashes also can replace mineral fertilisers apart from nitrogen, which is not present in the ashes.

Keywords: Biomass ashes, compost, crops, organic fertiliser